

CHAPTER 1

Okay! I know this book is called "Earth Science", but before you can understand how the earth works, you have to look at something much larger...

The Universe

The **universe** is a word we use to describe everything that exists...everywhere! **It is huge!**

So how big is the universe? *Nobody knows!* Scientists who study the universe are called **astronomers** "a-straw-no-murs". Astronomers have many different ideas about how large the universe is, but they are still working on the answer!

The most important tool that astronomers use to study the universe is the **telescope** "tell-eh-scope". The telescope is a tool that is used to make faraway objects look closer than they are. This makes it easier for people to study objects that are far away!



However, astronomers know that even their most powerful telescopes cannot see everything in the universe!

What astronomers do know is that the universe has billions of what are called **galaxies** "gal-axe-eez". So what makes up a galaxy? A galaxy is made up of gas, dust and also a large group of **stars**.



Before you explore what makes up a star, let's take a closer look at our own galaxy...

Astronomers like to name the galaxies they study. The galaxy we live in has been named... The **Milky Way galaxy!**

So what does the milky way galaxy look like?

Well... astronomers have never taken a vacation beyond our galaxy! So, they have not been able to take a picture of the Milky Way! However, their best guess is that our galaxy looks like a huge spiral! In fact, many of the galaxies that astronomers see have the same spiral shape. If it helps you to think about what a spiral galaxy looks like - go into your bathroom and flush the toilet. Do you see how the water forms a spiral as it flows down the drain? That spiral shape is what a spiral-shaped galaxy looks like!

Let's get back to those huge balls of glowing gas that make up all galaxies...

Stars

Stars are huge balls of hot gas that give off a large

amount of energy (like heat and light)! Do you know the name of our nearest star? You guessed it... **the sun!**



Whatever you do...never look straight at the sun! It will hurt your eyes!

Stars give off a lot of heat, but some give off more than others...you can tell how hot a star is by its color!

Blue stars are the hottest stars.

White stars are cooler than blue stars.

Yellow stars are cooler than white stars.

Orange stars are cooler than yellow stars.

Red stars are the coolest of them all!

Red stars may be the coolest star in the group, but they are still very hot...around 4000°F. That's hot! Our own sun is a yellow star and its temperature is about 9500°F. **Ouch!**



I'M GETTING TIRED OF PEOPLE CALLING ME "DIRTY".

To give you an idea of how hot that is... the temperature of your bath water is probably only about 85°F.

Galaxies may be filled with gas, dust and stars...but they also contain everything that is spinning around the stars too! Some of these things are:

Comets

Asteroids "ast-ur-oids"

Meteoroids "meet-ee-or-oids"

and Planets

A **comet** is a chunk of ice, gases and dust that spins around a sun. Some scientists like to call comets, "dirty snowballs." the movement of an object around a sun is known as an **orbit**. (You will need to remember this word! You'll be seeing it a lot!)

But wouldn't a chunk of ice melt as it gets close to the sun?

Yes it does!

In fact, most pictures you see of comets have a long tail that is pointing away from the sun! This tail is made up of melted ice and dust that is leaving the comet as it gets closer to the sun!

Asteroids are large chunks of rock that are floating in space. The size of these rocks can be between 20-600 feet tall. How big is that??? Well... A car is about five feet tall. So the smallest asteroid would be as tall as four cars stacked on top of each other! You would have to stack 125 cars to reach the top of the largest asteroids!

Meteoroids are smaller chunks of rock (less than 20 feet long) that float around in space. Millions of meteoroids float towards us everyday. When this happens, the meteoroid is called a **meteor** "meet-ee-or". You may have heard of meteors as "shooting stars" or "falling stars"! These small chunks of rock are moving very quickly and heat up quite a lot! In fact, they get so hot that pieces of them burn off and leave a trail behind them!

Most meteors burn up before they reach the ground, but not all of them! If a meteor smashes into the ground, it can cause a lot of damage! When this happens, astronomers call the meteor a **meteorite** "meet-ee-or-ite".



Finally, many stars have very large round bodies of rock or gas that orbit around them. These objects are called **planets**. There are nine planets that orbit our sun! Our planet, **Earth**, is the third planet from the sun.

All of the planets, asteroids, meteoroids and comets that orbit a star make up one **Solar system** "so-lar sis-tem". Astronomers have found many different solar systems in our own Milky Way galaxy.

In the next chapter, you are going to explore the planets that make up our solar system!



Match the words in the first column to the best available answer in the second column.

- | | |
|--------------------|--|
| _____ Meteor | 1) Huge balls of hot gas that give off a large amount of energy (like heat and light)! |
| _____ Earth | 2) The movement of an object around a sun |
| _____ Solar system | 3) "Shooting stars" or "falling stars"; falling meteoroids that move so quickly through the air that they get very hot and burn up, leaving a glowing trail behind them in the air |
| _____ Meteoroids | 4) Our nearest star |
| _____ Planets | 5) Smaller chunks of rock (less than 20 feet long) that float around in space |
| _____ Meteorite | 6) Very large round bodies of rock or gas that orbit around stars |
| _____ Orbit | 7) The name given to a meteor that does not burn up in the air and smashes to the ground |

- | | |
|------------------------|--|
| _____ Stars | 8) Large chunks of rock that are floating in space |
| _____ Milky way galaxy | 9) Our home planet, the third planet from the sun |
| _____ Telescope | 10) All of the planets, asteroids, meteoroids and comets that orbit a star |
| _____ Comet | 11) Scientists who study the universe |
| _____ Asteroids | 12) A tool that is used to make faraway objects look closer than they are. |
| _____ Sun | 13) The name of the galaxy that we live in |
| _____ Galaxies | 14) A large group of gas, dust and many stars. |
| _____ Universe | 15) A chunk of ice, gases and dust that spins around a sun; a "dirty snowball" |
| _____ Astronomers | 16) A word we use to describe everything that exists |

Compare and contrast the Stars and Planets

Compare (things that are the same between these two)	Contrast (things that are different between these two)

Place the following in order from largest to smallest:

Stars
Universe
Solar system
Comet

Meteoroid
Meteorite
Galaxies

1.
2.
3.
4.
5.
6.
7.